Process to Identify High Priority Corridors for Access Management Near Large Urban Areas in Iowa

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August 2003
Preface

- This research was funded by the Iowa Department of Transportation Office of Traffic and Safety.
- That funding was matched partially through the Midwest Transportation Consortium.
- A follow-up project is exploring detailed corridor management techniques on two of the high-ranked corridors identified by this project:
  - US 20 west of Dubuque
  - IA 163 east of Des Moines
Presentation Outline

- Current Iowa DOT access classes and map
- Research project goals
- Research methodology
- Key ranking results
- Top ranked potential Improvement corridors
- “Proactive corridor” identification process
- Next steps: thinking about corridor management
# Iowa DOT Access Priority Ratings (English Conversion)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Access points at interchanges only</td>
</tr>
<tr>
<td>2</td>
<td>Access points spaced at minimum 2625 ft</td>
</tr>
<tr>
<td>3</td>
<td>Access points spaced at minimum 984 ft rural, 656 ft urban</td>
</tr>
<tr>
<td>4</td>
<td>Access points spaced at minimum 656 ft rural, 328 ft urban</td>
</tr>
<tr>
<td>5</td>
<td>Iowa DOT has minimum access rights acquired</td>
</tr>
<tr>
<td>6</td>
<td>Iowa DOT has no access rights acquired</td>
</tr>
</tbody>
</table>

Source: Iowa DOT.
State of Iowa: High Priority Access Classifications
This research project was intended to produce a strategy for addressing current and future access management problems on state highway routes located just outside urban areas that serve as major routes for commuting into and out of major employment centers in Iowa.

There were two basic goals for the project:

- Develop a ranking system for identifying high-priority segments for access management treatments on primary highways outside metro and urban areas.
- Focus efforts on routes that are major commuting routes at present and in the future

An example commuting corridor: US 6 to the west of the Des Moines metropolitan area
US 6, In The Waukee Area
Technologies Used

- A geographic information system (Arc View GIS) was used to integrate various Iowa DOT databases, including roadway characteristics, traffic, and crash records
  - Crash records used were from 1997-1999

- A 2940 zone traffic model was developed using TRANPLAN software to estimate and forecast commuting activity on all Primary routes
  - Known model weakness: border metro areas
Iowa Forecast Population Growth By County

Forecast Population Growth By County
2000 Through 2020

Woods and Poole Forecasts
- Decline
- 0 - 2500
- 2500 - 10000
- 10000 - 20000
- 20000 - 50000
- 50000 - 100000

Scale: 100 0 100 200 Miles

North, South, East, West
Traffic Model Zone Structure
1999 Estimated Traffic Model
Commuting Trip Volume

1999 Work Trip Volume
2004 Estimated Traffic Model
Commuting Trip Volume

2004 Work Trip Volume
Forecast Absolute Change In Commuting, 1999-2004
Forecast Percentage Change in Commuting, 1999-2004

Percent change in work trip traffic, 1999 to 2004
## Access-Related Crashes Included In Analysis

<table>
<thead>
<tr>
<th>Collision Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Rear-end/right-turn collision</td>
</tr>
<tr>
<td>5</td>
<td>Rear-end/left-turn collision</td>
</tr>
<tr>
<td>12</td>
<td>Broadside/right-angle collision</td>
</tr>
<tr>
<td>13</td>
<td>Broadside/right-entering collision</td>
</tr>
<tr>
<td>14</td>
<td>Broadside/left-entering collision</td>
</tr>
</tbody>
</table>
Ranking Factors Used

- **Frequency**—This indicator represents the number of crashes that appear to be access related, in particular those that involve turning vehicles. All turning crashes were included, whether they occurred at private driveways or public road intersections.

- **Rate**—This indicator is the frequency of access-related crashes per million vehicle miles traveled (VMT).

- **Loss/severity**—This indicator measures the estimated cost of access-related crashes in dollars, including an estimate of the cost of fatalities, personal injuries, and property damage.

- **Percentage access related**—This indicator represents the percentage of total crashes that appear to be access related.
Iowa Commuter Routes: Frequency Rankings
Ranked Commuter Routes by Access-Related Crash Rate
Iowa Commuter Routes: Loss Rankings
Ranked Commuter Routes by Percentage of Access-Related Crashes

Commuter Routes
- 1 - 25
- 26 - 50
- 51 - 75
- 76 - 109

Corporate Limits
State Boundary
Iowa DOT Districts
## Access-Related Crash Losses
### On Commuter Routes
### By Iowa DOT District

<table>
<thead>
<tr>
<th>District</th>
<th>Loss from Total Crashes</th>
<th>Loss from Access Crashes</th>
<th>Percentage of Access Crash Loss to Total Crash Loss</th>
<th>Percentage of District Access Crash Loss to Total Access Crash Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$19,266,493,500</td>
<td>$4,132,017,500</td>
<td>21.45%</td>
<td>54.52%</td>
</tr>
<tr>
<td>5</td>
<td>$9,171,777,500</td>
<td>$1,698,090,000</td>
<td>18.51%</td>
<td>22.41%</td>
</tr>
<tr>
<td>6</td>
<td>$5,818,520,000</td>
<td>$828,232,500</td>
<td>14.23%</td>
<td>10.93%</td>
</tr>
<tr>
<td>2</td>
<td>$1,856,240,000</td>
<td>$487,407,500</td>
<td>26.26%</td>
<td>6.43%</td>
</tr>
<tr>
<td>4</td>
<td>$1,374,847,500</td>
<td>$352,772,500</td>
<td>25.66%</td>
<td>4.65%</td>
</tr>
<tr>
<td>3</td>
<td>$752,072,500</td>
<td>$79,925,000</td>
<td>10.63%</td>
<td>1.05%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$38,239,951,000</strong></td>
<td><strong>$7,578,445,000</strong></td>
<td><strong>20.00%</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>
Highest Ranking Four-Lane Or Partial Four-Lane Corridors, Total Crash Rates
Highest Ranking Four-Lane Or Partial Four-Lane Corridors, Access-Related Crash Rates
Iowa Commuter Routes:
Top Ranked Corridors for Potential Improvement

Red circles indicate pilot projects
“Pro-Active Corridors”

- Some corridors may not have access-related crash problems today, but could have in the future.
- “Pro-Active Corridors” were identified based on the following factors:
  - Forecast commuting traffic growth
  - Proximity to metro and large urban areas
  - Access priority ranking of 3, 4, 5, 6, or none
  - Driveway access density
Pro-Active Corridors: Most Likely Future Access Issues
Most Access Management Problems Happen Incrementally

- Poorly managed corridors don’t happen overnight; they happen over many years
- They often happen one decision at a time
- A series of decisions is usually involved in degrading a corridor
  - What can one more median opening hurt?
    - One more commercial driveway?
    - One more traffic signal?
  - The problem is that all the small, bad decisions cumulate into one large problem—a “hairball”, to use computer programming slang
Next Steps: Corridor Management Pilot Projects

- Start with a small set of corridors that rank high in terms of access problems and where improvement is possible.
- Develop model access management corridor analysis tools, plans and agreements.
  - There was such an effort underway on US 6 in District 4 already.
  - New pilot projects were added along US 20 and IA 163 (Districts 6 and 1).
- The corridor plan will be a “vision” for how the corridor will look in the future, signed off on by both the Iowa DOT and local governments.
Some Critical Access Management Standards For Commuter Routes

- Clearance of functional areas of interchanges and intersections
- Public road density and traffic signal spacing
- Median breaks
- *Commercial* driveway density and spacing
  - Residential and farm field entrances are less critical unless you expect land use change
- Driveway sight distance
  - This is the major issue on many two-lane rural arterials
Think and Manage Beyond the ROW Line On The Mainline

- Many of the best access management solutions involve making changes to site plans for new developments and redesign of existing developments.
- Some of these solutions include improved internal circulation, parking lot interconnection, cross-access, joint access, and alternative access roads (e.g. backage roads).
Coordinate Access Management and Land Use Planning

- Transportation agencies have authority over traffic signals, interchanges, intersections, medians, and driveway entrances.
- They *do not* have authority over land use plans, zoning, and subdivision designs or platting.
- Staff who manage driveways and other access features need to consult with local land use planners on an ongoing basis (and visa versa).
Transportation corridors are valuable assets that can be diminished in value through a series of poor access decisions.

- Think of poorly managed access as extra depreciation.

The value of corridors can be preserved through access management.

The end result of poor access management is often a very expensive bypass combined with a remaining arterial that still doesn’t function very well.
Presentation Recap

- Current Iowa DOT access classes and map
- Research project goals
- Research methodology
- Key ranking results
- “Proactive corridor” identification process
- “Proactive corridor results”
- Next steps: thinking about corridor management
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